

## ***Interactive comment on*** **“3-D-geomechanical-numerical model of the contemporary crustal stress state in the Alberta Basin” by K. Reiter and O. Heidbach**

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Received and published: 16 October 2014

We thank the referee for his/her friendly and very constructive comments and suggestions, which helped to improve this manuscript. In the following we will answer referees questions:

Point 1 (lithospheric loading/isostatic rebound):

Section 3.1.1. of the manuscript introduces the general tectonic and sedimentary history of the Alberta Basin. Thrusting of the Rocky Mountains as part of the North American Cordillera onto the Alberta Basin, superposing the Canadian Shield, is negligible today (Henton et al., 2006; Mazzotti et al., 2011). Of course these processes prob-

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ably are still memorized in the contemporary stress field – the elastic memory of the crust. However, our model approach does not aim at implementing all processes that contribute to the contemporary stress field, but to find the best-fit to the data. All processes, regardless if they are ongoing or finished are reflected in the applied displacement boundary conditions.

The same argument holds on for the isostatic rebound that is observed in the research area [Henton et al., 2006]. Several model runs with stepwise removing ice load are for sure of academic interest, but this is beyond the focus of this paper. However, we did not noticed any deviation between the model and the data which could be explained by isostatic rebound. As we got no new insights of stress vs. isostatic rebound interaction, we avoided discussion on that topic.

Point 2 (model limitations):

It is true, that the resolution of such a large scale model is limited. We discuss this topic now in the discussion chapter together with other model uncertainties in section 6.2 (Reliability of the predicted 3D stress field).

Point 3 (Title modification):

This is a very good idea, we changed to title to “. . . Alberta Basin (Canada)”

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Interactive comment on Solid Earth Discuss., 6, 2423, 2014.